Technical Notes

• NATIONAL SOCIETY FOR BUSINESS BUDGETING •

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## EDITORIAL COMMENT

One of the paramount problems of business planning is the establishment of a sound sales budget. The sales plan provides the foundation upon which every other element of our budgetary plan must rest.

In this edition of TECHNICAL NOTES, the problems of establishing a sound sales forecast are discussed by MR. R. F. DICK and the question of utilizing the sales plan as the foundation for an inventory budget is analyzed by MR. R. A. SANDERSON.

The purpose of presenting these two papers in a single issue is to stress the relationship between the two budgets in addition to discussing the refinements of sales and inventory budgeting.

The Chicago Chapter is proud to participate in the issuance of the Society's technical publication. Both papers were selected from addresses given at Chicago meetings in the course of the past season.

THE CHICAGO CHAPTER

## MARKET RESEARCH - EFFECT ON SALES BUDGETS

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In discussing this subject of market research and its effect on sales budgets, there are three basic premises that should be kept in mind:

First, that market research up to this point has been utilized primarily for the development of factual data in connection with sales planning, sales strategies and the perfection of sales control tools and sales methods. Considerably less use has been made of market research in providing background material for the sales budget.

Second, that market research is not an exact science -- much of it has been empirical in nature. It has been a process of "cut and try." Moreover, further refinements are still essential in fields such as the measurement of advertising effectiveness, the development of industrial market potentials, and measurements of selling effectiveness.

Our third premise is that market research can and should be utilized for more than just a sales forecast -- actually its utilization can extend into many elements of sales expense from the standpoint of establishing more accurate standards. It is axiomatic that the greater the accuracy and reliability of the sales forecast, the keener the cutting edge of the budget tool.

What is market research? While this subject is frequently subjected to boondoggling in semantics, all we are concerned with here is getting on the same wave length so that we understand each other. My friends in the American Marketing Association would probably object to a simple definition such as:

> Market research is a study of those quantitative and qualitative characteristics of a market which, when properly evaluated, enable management to take some sales action. This sales action can deal with sales estimates, sales quotas, product moves, advertising expenditures, delineating sales territories, combatting competitive efforts, etc., ad infinitum.

Let's take a quick look at what I mean by quantitative characteristics of a market. How large is the market -- how much will the market absorb of our product -- of our total industry output -- how much can be sold? These are quantitative measurements that explore the depths of a market. Growing out of such studies are basic facts influencing the sales budget. For example, and to mention but a few . . .

a) Sales quotas for a company
b) Sales quotas for individual territories
c) Sales territorial delineation
d) Assignment of salesmen to territories
e) Determination of advertising expenditures
f) Measuring sales effectiveness

Now for a second quick look at another phase of market research -- qualitative characteristics dealing with the nature of a market and marketing methods (with no apologies to the marketing academicians).

Uses of the product, reasons for demand, buying habits, consumption rates, price influence on consumption, product design, styling and engineering, call frequency, order size, and sales cost analyses are varying types of qualitative analyses which can be used along with quantitative research measures in order to arrive at more realistic sales budgets.

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With these prefacing remarks concluded, we can now turn our attention to 3 areas where market research influences the sales budget per se, and finally, what you budgeteers should check to see that an acceptable pattern is followed by the sales department. Our discussion will cover:

. . . . Long-range sales planning
. . . . Short-term sales forecasting
. . . . Relating the sales budget to facts uncovered by qualitative research techniques, and finally,
. . . . The budgeteer's check list against possible sales department double talk, or (as a sub-title),

"The 3 Little Pigs Use Market Research to Take the Fat off the Wolf"

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I. Long-Range Sales Planning - A sales budget geared only to a succession of one-year sales plans is likely to trip itself up. Your business and mine should have intelligent long-range planning. We add new products -- we add new sales territories -- we add additional channels of distribution -- we add new salesmen -- and we add new

types of advertising and sales promotion. This requires thinking and planning beyond a one-year period. It requires planned expenditures beyond those expressed in a current year sales budget.

The right and responsibility of the budgeteer and the financial executives to participate in long-range planning, in my opinion, is not even debatable.

Unfortunately, time and again we have seen dollars wasted in those companies where calculated and sound financial thinking has been washed away in favor of irrational and non-factual sales opinion.

For example, the "sell-all-you-can-this-year" theory may be unwise and unprofitable from the standpoint of inducing chaotic competition, or by increasing sales cost, or by marketing a new product before it is ready, or by pushing any new product before the market is ready.

The budgeteer who understands what the long-range sales planning is and participates in its formulation (from the standpoint of what sales costs will be incurred) is in a sound position to evaluate the recommended sales budget for the immediate year in question. Long-range planning is the antenna of sales management and the budgeteer's radar beam for evaluating subsequent sales budgets. Market research makes a worthwhile contribution to long-range sales planning because through field survey techniques, trend analyses, questionnaire methods, and statistical forecasts, it provides factual and reasoned answers with respect to such questions as:

..... What is our over-all market position?

..... What do we have to do to come up to, maintain or exceed our position with respect to each of our leading competitors?

..... What is the reaction of customers and prospects to our proposed new product line?

..... Should our territorial coverage be increased, and what will this do to our sales manpower requirements?

..... How will our future sales plans influence our productive capacity, our distribution costs, our advertising appropriations, our channels of distribution, and our field selling costs?

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We oversimplify the problems by saying that market research provides the facts, analyses and figures required by management to do an interpretative job out of which should come our long-range sales plans.

However, we do not oversimplify the problem when we say that the budgeteer should acquaint himself with the long-term sales planning so that he can intelligently question the anticipated costs involved in accomplishing established marketing objectives. Moreover, so that he can advise and counsel in connection with the anticipated sales expenditures, the budgeteer should also have access to the market research data that provided the basis for such management judgment that was developed.

And now let's examine the short-term forecast . . . .

II. Short-Term sales forecasting through quantitative market research techniques brings us into the happy hunting grounds of market researchers, budgeteers and sales managers -- an area of frequent friction and crystal-gazing. An area -- and I quote -- where some of us "add, subtract, multiply and then guess."

Prognosticating future sales is either a challenge or a chore, depending upon the glasses through which you are looking (and I don't mean bottoms up!). In either event, there is no perfect answer, and the accuracy of your forecasting by market research techniques will always be penalized by certain limiting factors. We are not striving for perfection -- we are striving for realism. Common techniques for estimating future sales include:

..... Basing sales estimates on last year's results plus or minus a given percentage according to management "hunch" or its feel of the situation.
..... Basing sales estimates on an economic forecast of general business conditions for the country as a whole, for a select group of industries, or for projected results of individual major accounts.
..... Basing sales estimates on an official pronouncement of obtaining a given percentage of the company's plant capacity.
..... Basing sales estimates on a projection of the company's 10 year trend line.

I am not concerned with the relative advantages or disadvantages of each of the foregoing. You budgeteers can draw your own conclusions as to relative soundness based on your own type of product, competitive situation, management policy, and age of company.

What about those sales forecasting methods which rely on market research? Here are some accepted ones.

First - Survey of salesmen by sales management in which each account is individually analyzed and studied by salesmen and sales supervision and a total company goal is put together by adding all of the major accounts, or at least those that contribute 80% or more of the total volume. A Chicago equipment manufacturer uses this method successfully. An alternative of this is where each salesman submits an estimate for his territory (with or without individual account analyses). Another alternative used by a Chicago paper manufacturer is where every salesman sits down with each of his customers and gets them to give an estimate of purchase requirements for the coming year.

Second - Development of market potential by statistical methods of quantitative research. Here is an effort to determine mathematically the market's ability to absorb your product.

Some companies use the Commerce Department's Gross National Product Figures from Survey of Current Business, supplied by the Council of Economic Advisors who prepare periodic forecasts of the year ahead. These figures include 1) personal consumption expenditures, 2) corporation expenditures, and 3) governmental expenditures.

In this instance, your company's annual sales increases and decreases as a percentage of a base year should be accompanied with percentage increases and decreases in GNP to see whether they move up and down with the national economic trend. With GNP forecasts for the year ahead, you can estimate what your sales should be, assuming that your sales pattern correlates at least roughly with that of the national economy.

An alternative method using GNP and your own past sales figures involves the use of index numbers. The trick here is to get a good base year -- both for GNP and for your own sales -- a year in which the relationship of your sales performance to that of the national economy was not affected by any unusual condition such as war, a merger or plant expansion, a strike, etc.

Third - Use of other indices - Sales Management's Buying Power Index consisting of retail sales, population and disposal income is an example of an index that is used by some companies in sales forecasting. (Also New Industrial Index, number of plants, value added by manufacturers, number of workers extended by Social Security payroll data). Through multiple correlation techniques, other companies mathematically select and weigh factors that reflect buying power for their product.
(Correlation studies Pioneered by Donald Cowan, Director of Research for Swift & Co.)

Curtis units, arbitrary factors, International Magazine Index are still other examples of indices that fit well with some companies' past sales experience and can therefore be used in making a sales forecast.

The Federal Reserve Board Index of Industrial Production and of consumer durables are used by other companies as sales forecasting tools when their past sales are found to correlate closely with the index.

The ideal situation in using either a national index or a company prepared index is to find one that leads your sales curve by several months or more. This is one of those general statements that a speaker can take license with. Most companies in the consumer durable goods field develop their company forecast by applying an anticipated percentage of industry to an industry forecast. They also first work with physical units rather than with dollar volume.

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The statistical techniques all have recognized limitations. For example, the single index method assumes that the factors influencing the sale of one product also influence the sale of other products. Again, any index merely reflects the capacity of a market to absorb so much of a product at a given period of time. It doesn't tell us what that market will do if we double our advertising effort. Again, the index does not tell us what will happen if competition changes its tactics. Finally, changes in business conditions, availability of raw materials, labor conditions, taxes, government restrictions and other variable factors of supply all complicate future sales predictions as do demand factors such as wages, employment, taxes, savings, prices, etc. In spite of these limitations, however, market research has made progress in exploring market potentialities and setting up sales quotas. It is axiomatic that judgment has to be exercised, however, in refining the sales estimate. Here again the budgeteer can bring his influence to bear by watering down the optimistic sales forecast through his knowledge and familiarity with economic conditions.

III. This brings us to the third point of our discussion -- what influence can market research have on various expense elements of the sales budget?

Today's pressure on profits should provide the impetus for the budgeteer and market-research-minded sales executive to go after those areas of expense where yardsticks can be established -- areas, incidentally, that have been overlooked during the lush periods of easy to sell business. We have some bad habits to correct growing out of sales management's tendency to overdo the judgment, decision-making side of its personality instead of relying on facts that are easily obtainable. Some of them need a mental catharsis which both the budgeteer and the market researcher stand ready to apply.

I have neither the time nor the qualifications to illustrate the specific techniques for evaluating through research all of the elements of sales expense that can be measured against standards. However, let's look at some critical ones.

1) Number of salesmen in the field - Based on territorial measures of sales potential, do we have too many or too few salesmen? Are we high-spotting, or are we over-concentrating with the result that some men who are starving to death should be released. A critical test for the determination of manpower is the analysis of workload based on number of accounts handled, number of calls required by size of account, prospecting calls provided; and then measuring this against total calls possible based on available time.

2) Measures of advertising effectiveness - Should the advertising expenditure

be increased or reduced by X number of dollars? If you will ditch the thinking of basing it on a fixed percentage of sales -- particularly on a rising sales trend -- you will be left with two alternatives:

Wither appropriating advertising dollars to do specific jobs on a rifle-shooting rather than a shotgun basis;

Or, establishing statistical measures to predict specific accomplishments from given expenditures. Max Ule of Kenyon & Eckart is one able marketeer who is doing much valuable work in this field.

3) Establishment of per diem allowance for salesmen's expenses. Many companies today are providing fixed per diem amounts to cover travel, hotel, meals, laundry, tips and other sales expenses. As in the foregoing instances cited, the per diem allowances for these expenses tend to tighten up the sales budget. Entertainment expense is still a sticky problem, although I understand that some companies with salary plus commission types of compensation plans are no longer reimbursing salesmen for entertainment expense.

4) Analysis of discounts and commissions by channels of distribution is another area of exploration that needs the attention of the budgeteer. The market research and sales control function washes up factual data with respect to:

..... business going direct
..... business going through distributors
..... business going to small accounts
..... business going through agents -- jobbers or other channels

Analysis will often disclose sub-marginal sales that should be dropped, sub-marginal accounts that should be shifted, good accounts that should be recaptured on a direct basis, and other variations and combinations which will affect the product and distribution mix, and the amount of discounts and commissions paid out. When these types of sales are analyzed in terms of the cost of getting them, frequently the budgeteer will be able to effect savings in expense.

5) Sales promotion tools, literature, exhibits, conventions and meetings. Here is an area of waste and sales department jargon and hocus-pocus that should be jointly scrutinized by the market researcher and the budgeteer. Almost without exception, customer surveys indicate that buyers feel that their suppliers throw away countless dollars on an endless barrage of sales literature, promotion frills and exhibits.

Pennies seditiously saved in other areas of a sales budget are literally shoveled out -- unquestioned -- in this area of sales promotion. I submit to you that this is an area of "sacred temples" that should be stormed by you budgeteers through a firm approach of logical inquiry and requested proof of results.

6) Finally, what about our product lines? Through consumer tests, buyer surveys, product sales tests and other techniques, we can and should be able to strengthen our sales budget by having answers to such questions as:

How good are our products? What is their market acceptance? Which ones should be trimmed from the line? Which ones should be restyled, redesigned, or which ones must be subjected to less costly manufacturing methods (including improvements in production equipment)?

In this area, the budgeteer with his cost and profit analyses should join hands with the market research department and with engineering to form a triad that will

best produce improved or new products at the lowest possible cost consistent with management policy on quality.

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This brings us down to the final phase of our discussion this evening -- The budgeteers check list against sales department double talk.

Before we proceed here -- I would like to review two points of view with respect to the war we are now in insofar as it affects specific sales planning or business planning in general.

This international "police action" may last out our lifetime. During this period, a heavy sword may hang over the heads of ours and the next generation. We must all think in terms of plans that will carry us ahead "long enough," but yet none of us really knows how long it may be. Contrasted to the point of view of time is the question of the speed with which the picture could change. In a fraction of an hour, the scene could shift from a permanent threat to the chaos of a worldwide march to destruction.

With these two points of view in mind, we have a planning job to do.

We should focus our attention on long-range plans and pass up expediency in favor of basic fundamentals. We must get rid of the excess costs -- burn out the dead wood -- trim the fat off of our operations. We all have to be flexible if we are going to be in a position to meet any quick change of conditions facing our companies. That means flexible sales planning -- but keep it related to long-term objectives and stay off the costly detours of minor emergencies and expediency.

I would like to present a brief check list which the budgeteer should use in his evaluation and approval of the sales budget. In using this list, of course, we are really checking both the long and short-term aspects of sales planning. From a practical standpoint we must recognize possible resistances from sales management. The degree of resistance, however, will depend largely upon the "open-mindedness" of the sales brass.

Our problem here reminds me a little of Napoleon's method of assigning his officers:

If they were bright and agressive, he put them in top-line operating jobs.
If they were bright and lazy, he put them in staff jobs
If they were dull and lazy, he put them in menial staff jobs.
BUT - If they were dull and agressive, he got rid of them because of the potential damage they could do.

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Now there is your proposed check list for evaluating the type of thinking and type of sales planning that eventually is reflected in the sales budget:

1) What are our current company policies with respect to pricing, credit, customer relations, product lines, advertising and promotion? Wouldn't you agree that weak, ineffectual and vacillating company policies in these areas could destroy the stability and soundness of a sales budget?

2) What are our methods of distribution, selling, territorial delineation and sales compensation? Wouldn't you agree that loose methods here result in building sales budget expense estimates that in themselves are loose and misleading?

3) What is our approach to new markets, further penetration into present markets, competitive market strategies, account development, penetration and coverage? Wouldn't you agree that if a non-factual approach is taken to the problem of sales forecasting, the very basis of our sales budget is open to question?

4) What are our current practices in the selection, training and development of sales manpower? Does the sales department use aptitude testing and other objective methods for the selection, training and development of its team? Wouldn't you agree that a weak sales team, or even a strong team with weak timber, could adversely affect actual results versus sales budget estimates?

5) What about the caliber of our sales supervision and field directions? Any group of salesmen needs intelligent leadership and guidance, plus effective control. Wouldn't you agree that lacking effective sales direction, the budget results could be horribly bad?

6) What are our methods for allocating sales effort, allocating advertising and promotion effort, and then setting up sufficient controls to measure the performance of that selling time and selling effort by men, by territories, by districts, by product lines, or by any classifications that are meaningful to your company operations. The budgeteer might suggest certain standards for evaluating both market and manpower performance. For example, profit contribution, cost patterns, results versus effort analysis, etc. Wouldn't you agree that without effective sales control, measurement, and positive corrective action by marketing management the sales budget could become a meaningless exercise in arithmetic?

Finally, what are our future sales objectives with respect to new products and growth in present product lines, and what service and productive facilities, working capital, manpower, and other resources will be required to meet the needs created by these long-term sales objectives? Here again the budgeteer will probably have to water down the enthusiasm of the sales brass so that realism rather than wishful thinking prevails.

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You budgeteers and financial men should be a real force in combination with the market research function to utilize more precise tools in effecting both short and long-term budgeting efforts. Sharper tools are available and can be selected within the limitations set by cost, time and need. Your actual accomplishments -- your potential results -- are the basis of a challenge and an opportunity that should stimulate the thinking of each of you, and bring out the best abilities in all of you.

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# THE INVENTORY CONTROL BUDGET

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## INTRODUCTION:

The inventory control budget may be said to be divided into two phases -- detailed control and over-all or general control. Detailed control of inventories is usually maintained in terms of physical units and is generally associated with material of production control. General inventory control is ordinarily expressed in terms of dollars and is associated with the over-all operating and financial budgets and forecasts. I frankly had a great deal of difficulty in attempting to determine which of these phases you might be interested in discussing tonight. I finally decided that the term "inventory budget" would probably be more closely associated with dollar control and will therefore confine my remarks to this phase of the problem. Naturally time would not permit even a full discussion of all the complexities and ramifications of dollar control, and I hope that the subject can be adequately covered by outlining the general features and problems encountered in the operation of this type of budget. At any rate, before attempting to present a discussion of inventories, I should like to point out and emphasize that each industry and each company within that industry which may be represented here tonight has its own peculiar inventory requirements. In order to function properly, any inventory control system must be tailor-made to fit exactly the needs and characteristics of that industry and that company. I will therefore attempt to emphasize only the general principles involved.

## OBJECTIVE AND IMPORTANCE

Simply stated, the basic objective of the inventory control budget is to maintain inventories at the minimum level consistent with production and sales requirements, thus effecting an economical use of working capital. This basic purpose of inventory control in itself reveals the fundamental conflict underlying the inventory problem -- the proper balance of inventory. An inventory may be too large and yet too small. An inventory may be balanced in total, yet it is entirely possible to have excessive and inadequate supplies of many individual items. Properly balanced inventories are perhaps one of the most important factors in a successful manufacturing (or merchandising)operation. The dangers inherent in excessive inventories are:

1. Idle working capital
2. Possibility of price declines
3. Possibility of slow-moving and obsolete stocks
4. Excessive costs of handling, storage, spoilage, taxes, and insurance

At the same time, inventory shortages produce dangerous consequences:

1. Unsatisfactory customer service
2. Excessive set-up costs and costly short-runs
3. Excessive material costs through uneconomical purchase quantities and emergency expediting
4. Labor problems resulting from irregular production

The inventory control budget attempts to minimize these risks by maintaining the inventory level in a proper balance with production and sales requirements. Ups and downs in sales are unavoidable. Swings in production may be avoided through the use of controlled inventory as a reservoir.

## CONDITIONS ESSENTIAL TO INVENTORY CONTROL

There are certain major conditions which are essential to the successful dollar budgeting and control of inventories and which must first be studied and resolved before attempting to establish the budget level.

1. Determination of the sales forecast
2. Standardization of product
3. Classification of inventories
4. Determination of minimum safety limits
5. Determination of standard inventory turnover

The sales forecast for the next year is, of course, the basic requirement in establishing any budget operation. While we will not attempt to discuss here the methods used in forecasting sales, it is important to consider those factors which will directly affect inventory control.

1. The sales forecast should be as all-inclusive as possible. That is, it should be based, if practicable, on anticipated sales of individual products. At least the budget should generally never be based on a unit larger than a product group.
2. Provision must be made for flexibility of the sales forecast. Changing market conditions, general economic trends, new products, etc. all tend to make for variations between actual and forecasted sales. This flexibility usually takes the form of short-term forecasts. The original sales forecast is made to cover a period of 9 to 12 months. This schedule is then further broken down in terms of sales for say a three-month period. The short-term forecast should then be reviewed at frequent intervals, usually monthly, and adjustments made for actual conditions. Any major variations in the short-term schedule should, of course, be reflected in the long-term forecast.
3. In certain cases, it may be desirable to establish special sales forecasts. These forecasts usually schedule sales for a period between the long-term forecast and the short-term forecast for a period of approximately 6 to 8 months. The purpose, of course, is to aid the purchasing department in establishing a commitment schedule on such items as special tooling, "made-to-order" parts and certain items of raw materials which may have to be purchased over a long range.

As a by-product of setting the sales forecast, but an extremely important by-product, consideration should be given to inventory standardization. All products should be studied carefully by engineering, production, purchasing and sales departments to eliminate any unnecessary items. Naturally, standardization is based on finished products; however, studies should also be made of raw materials, components and manufacturing processes. The program should include and consider the following factors:

1. Elimination of unprofitable and low-volume products.
2. Reduction of the different kinds of raw material and component requirements to a minimum
3. Establishing standard manufacturing processes as far as possible for each type of product.

A program of standardizing product lines is essential to the intelligent maintenance of inventories at a minimum level. Additions to a line frequently result simply

in splitting sales between all the products. If new items are required, they should ordinarily replace an existing product.

Proper classification of inventories for budgetary purposes is probably obvious. However, the type of business being budgeted will generally govern the inventory components (raw material, work in-process and finished goods) which will be used in computing inventory turnover. Obviously, a company manufacturing standard stock products will be concerned with a turnover ratio of sales to finished goods, while a job order shop will be most concerned with raw material and work in-process turnover. I would like to digress a moment from my original thought of discussing only the general phases of over-all inventory control by dollar amounts and point out a phase of detailed inventory control which I have always felt worthy of consideration, yet one which is generally ignored. Many inventory control systems may be said to be overcontrolled because of the tremendous number of items which are included in the system. On the other hand, the reason generally given for the lack of any system is the tremendous amount of detail involved. Any analysis of inventory, I venture to predict, will show exactly the same following general pattern:

1. A few major items involving the major inventory investment (say 75% cost and 10% quantity).
2. A middle class of items (say 20% cost and 15% quantity).
3. The numerous but very inexpensive items (5% cost and 75% quantity)

Items included in the first category should be controlled weekly or even daily. Strict adherence to ordering, receiving, scheduling and processing these materials should be maintained. On the other hand, the items in the third class can be carried with a minimum of investment although handling and controlling such items will involve the greater cost. Since these items are also rather elusive to close control, detailed analysis and records on them can and probably should be dropped. Adequate supplies can then be ordered (say six months) and an order point quantity set aside. When the inventory quantity is reduced to the order point quantity, the stockkeeper is automatically put on notice to place a requisition with the purchasing department to replenish the stock.

Minimum safety limits should be established by management. The minimum safety limit is defined as the lowest permissible limit below which an inventory should not be permitted to go in order not to interfere with the delivery of sales. This level should ordinarily be set for finished products by the sales department in conjunction with the production department at the time the sales forecast is made. In setting the limit, consideration should be given to past history, seasonal factors, buying habits, average size of a single order, emergency orders, etc. The production department should determine the minimum time required for the production cycle, considering both raw material in-plant time and production lead time. In many cases it is desirable at this time to study the possibilities of maintaining working banks of parts or assemblies. Such working banks act as a cushion between variation in rates of production between departments. Working banks are particularly advantageous where the final operations on parts or assemblies may represent considerable cost but are relatively short in point of time. In a highly seasonable business, it may be desirable to establish more than one minimum limit. It must be emphasized that the minimum safety limit is not the level at which the inventory will be kept. Any stabilization of production to avoid seasonal fluctuations, excessive short runs and set-ups, emergency orders, etc. will obviously result in carrying inventories at a level in excess

of this minimum safety point. Thus, in order to obtain a properly balanced inventory level, the inventory will constantly fluctuate between a minimum and a maximum safety limit. Control of the inventory below this maximum level to prevent an excessive accumulation of material is usually provided through the use of inventory turnover ratios or the ratio of sales to inventory. The yearly turnover ratio is the ratio of annual sales to the average inventory carried during the year. In many cases, companies will erroneously compute this average inventory based on the opening and closing inventories only. Where inventories fluctuate materially throughout the year, this calculation will result in some distortions. In computing turnover ratios, it is generally advisable to use the average of the actual inventories for say a six months' period, each month recalculating the inventory turn by dropping the first month and adding the current month.

For purposes of budgetary control, a standard inventory turnover is computed. This standard is the desired ratio of annual sales to average inventory and is the yardstick against which the actual turnover is measured. This ratio, therefore, must be carefully chosen. Past history, tempered by current conditions (determined and considered when setting the sales forecast) is the generally accepted means in setting the standard. After the standards are determined (by product or product group) they should be checked carefully. Substantial differences in the various ratios should be investigated and accounted for. Although the standard is predetermined, it should never be frozen. Periodic checks and revisions should be made throughout the year to coincide with the short-term sales forecast.

## THE INVENTORY BUDGET

In order to expedite this discussion and to establish general principles only, I would like to confine my remarks and examples on establishing the budget to finished goods only. This is the starting point in determining the budget, and the in-process and raw material inventories are determined after establishing the finished goods inventories and production budgets. The methods used are basically the same, the essential difference being that finished goods inventories are based on sales, and work in-process and raw materials on total production.

The inventory budget must be set with the following requirements in mind:

1. Maintain inventory above the minimum limit.
2. Maintain inventory below the maximum limit determined by the sales forecast and standard inventory ratio.
3. Maintain stabilized or nearly stabilized production.

At the beginning of the budget year we would have one known factor, the opening inventory. By comparing a budgeted inventory, computed by dividing the sales forecast by the standard turnover ratio, with the known opening inventory, an inventory increase or decrease may be determined. This budgeted increase or decrease in inventory should then actually take place during the following year by producing more or less products than are required to meet sales requirements as they are forecasted by the sales budget.

As an example, assume the following conditions applicable to product X:

| | |
|---|---|
| Sales Forecast | $120,000 |
| Standard Turnover | 4 |
| Actual Opening Inventory | $ 40,000 |
| Budgeted Average Inventory | $ 30,000 |

In this case, the inventory for the year should average $30,000. Assuming no seasonal fluctuation, the monthly inventories for each month in the year should be $30,000 and the over-all production budget would call for an inventory decrease of $10,000.

## THE PRODUCTION BUDGET

The production budget is therefore established after determining the increase or decrease in the inventory. This budget is based on the sales forecast plus or minus the increase or decrease in the inventory. The complete integration of the three factors of sales, inventory and production should be noted; all are dependent and cannot be considered without reference to each other. Assuming in our previous example that forecasted sales for the current year are the same as actual sales for the previous year, and that actual production required for that year to produce sales of $120,000 was $100,000, the current year's over-all production should be budgeted at $90,000. Of course, this simple example further assumes no changes in selling prices or costs.

## SEASONAL VARIATION

As previously mentioned, the short-term sales forecast should be prepared to reflect seasonal variations. The inventory budget is prepared to adjust the swings in sales in order to maintain production at a stabilized level, or at a stabilized level for a certain period during the year. This statement, of course, assumes that it is management's policy to produce at a constant rate during the year. In some businesses, which may be drastically affected by sudden changes in market conditions, production levels may follow the swings in sales. After the over-all yearly budget has been prepared, the details of the monthly or quarterly budget will be worked out. Taking our previous example, let us make the following additional assumptions:

| | |
|---|---|
| Sales: | |
| 1st quarter | $20,000 |
| 2nd quarter | 60,000 |
| 3rd quarter | 20,000 |
| 4th quarter | 20,000 |
| | $120,000 |
| Minimum safety limit | $ 15,000 |

The quarterly budget would then be made as follows:

| | Sales | Production | Inventory | Turnover |
|---|---|---|---|---|
| 1st quarter | $20,000 | $23,000 | $46,000 | .5 |
| 2nd quarter | 60,000 | 23,000 | 19,000 | 1.9 |
| 3rd quarter | 20,000 | 22,000 | 25,000 | .9 |
| 4th quarter | 20,000 | 22,000 | 30,000 | .7 |
| | $120,000 | $90,000 | $30,000 | 4.0 |

From this budget we can now determine that the budgeted inventories will reflect the desired requirements:

1. Inventory turnover, 4.
2. Average inventory, $30,000.
3. Inventory is maintained above the minimum limit.
4. Over-all inventory for the year is maintained below the maximum limit based on the turnover.
5. Inventory at the end of the year will reach the desired year end balance, $30,000.
6. Production has been stabilized throughout the year.

## WEAKNESSES IN INVENTORY CONTROL

There are usually certain weaknesses which I have noted generally in inventory control systems and which I would like to point out here.

1. As previously mentioned, some companies have a tendency to overcontrol by subjecting all items to the same rigid control.
   Suggestion - Determine max-min quantities on large quantity, inexpensive items.
2. Companies in technical fields are plagued with engineering changes.
   Suggestion - Establish procedures of management review and approval of engineering change proposals.
3. Failure to report overages and shortages.
   Suggestion - Establish regular procedures for current periodic reporting.
4. Lines of responsibility are often loose.
   Suggestion - Operations should be reviewed and definite lines of authority established along functional lines (sales, production, purchasing).
5. Inadequate personnel.
   Suggestion - There is no substitute for personal judgment in an inventory control system. No inventory can be controlled by records alone. Intelligent and continuous review of the records is required by competent individuals.

## SUMMARY

In summary, the purpose of the inventory budget is to maintain a minimum inventory level consistent with sales and production requirements. On an overall dollar basis, this is usually accomplished as follows:

1. For each product (or product group) a standard inventory turn-over ratio is determined.
2. This standard is compared to actual inventories throughout the year.
3. The standard turn-over ratio is applied to forecasted sales for each product to determine the desired average inventory and to compute the inventory increase or decrease for the year.
4. The inventory increase or decrease is reflected in the production budget for the year.
5. Production is scheduled over the year to attempt to obtain the maximum of stability using the reservoir effect of the inventory to close the gap between seasonal sales swings and the stabilized production level.